63D CONGRESS, 2d Session. } HOUSE OF REPRESENTATIVES. { DOCUMENT No. 1023.

14

CAPE CHANNEL, PAMLICO SOUND, N. C.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS ON PRELIMINARY EXAMINATION AND SURVEY OF CAPE CHANNEL, INCLUDING THE INNER AND OUTER APPROACHES THERETO, ON THE EAST SIDE OF PAMLICO SOUND, N. C.

JUNE 8, 1914.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with illustration.

WAR DEPARTMENT,
Washington, June 6, 1914.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, dated 5th instant, together with copies of reports from Maj. H. W. Stickle, Corps of Engineers, dated December 10, 1912, and February 11, 1914, with map, on preliminary examination and survey, respectively, of Cape Channel, Pamlico Sound, N. C., made by him in compliance with the provisions of the river and harbor act approved July 25, 1912.

Very respectfully,

LINDLEY M. GARRISON,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, June 5, 1914.

From: The Chief of Engineers, United States Army.
To: The Secretary of War.
Subject: Preliminary examination and survey of Cape Channel, Pamlico Sound, N. C.

1. There are submitted herewith, for transmission to Congress, reports dated December 10, 1912, and February 11, 1914, with map, by Maj. H. W. Stickle, Corps of Engineers, on preliminary examination and survey, respectively, of "Cape Channel, including the inner

and outer approaches thereto, on the east side of Pamlico Sound, N. C.," authorized by the river and harbor act approved July 25, 1912.

2. The locality apparently contemplated by the act is a basin of irregular shape about 9 miles long and varying from 1 to 3 miles in width on the inner side of Barrier Beach, abreast of the towns of Buxton, Trent, and Hatteras. The improvement desired appears to be the deepening of the outer and inner channels leading into this basin. The district officer submits estimates of cost for providing depths of 6, 7, and 8 feet in the three approach channels, and for similar depths in the inner channel. He believes that the improvement of the inner channel is not justified at the present time, but expresses the opinion that the commercial and other interests involved justify the improvement of the least expensive outer approach, known as the Ralston Channel, to a depth of 6 feet at mean lower low water and a bottom width of 150 feet, at an estimated cost of $12,300, with a maintenance charge of $250 annually. The division engineer concurs in this opinion.

3. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, dated May 19, 1914. The board is in general accord with the views of the district officer and the division engineer, but it is believed that the improvement of Buxton Channel would better serve the needs of the community and would probably involve less cost of maintenance than the improvement of Ralston Channel. The board therefore reports that in its opinion it is advisable for the United States to undertake the improvement of the Buxton Channel at an estimated cost of $17,900, with the understanding that the project will be discontinued in case the cost of maintenance is found to be excessive when compared with the commercial benefits.

4. After due consideration of the above-mentioned reports, I concur with the views of the Board of Engineers for Rivers and Harbors, and therefore report that the improvement by the United States of Cape Channel on the east side of Pamlico Sound, N. C., is deemed advisable to the extent of dredging Buxton Channel to a depth of 6 feet at mean lower low water and a width of 150 feet, at an estimated cost of $17,900, the full amount of which should be provided in one appropriation. The cost of maintenance is uncertain, and the project is recommended with the understanding that it will be discontinued in case the maintenance cost is found to be excessive.

DAN C. KINGMAN,
Chief of Engineers, United States Army.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS ON SURVEY.

[Third indorsement.]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
May 19, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. This is a report covering preliminary examination and survey of Cape Channel, including the inner and outer approaches thereto, on

the east side of Pamlico Sound, N. C. The interests to be served by the desired improvement are the villages of Buxton, Trent, and Hatteras, with a total population of about 1,000 and a scattering population of about 700, located on Barrier Beach, the narrow strip of land between the Atlantic Ocean and Pamlico Sound, in the vicinity of Cape Hatteras.

2. Inside the Barrier is a basin of considerable size, known as Cape Channel, having a depth of 6 to 12 feet, but it is separated from the deep water of Pamlico Sound by shoal areas. There are two principal outer approach channels, Buxton Channel, near the east end of Cape Channel, and Ralston Channel, near the west end. These channels have inadequate depth, and the improvement desired is the enlargement of one or both. The commerce involved amounts to about 2,650 tons of a miscellaneous character, carried on small power boats and schooners. The principal occupation of the community is fishing.

3. A survey having been made, the district officer presents plans and estimates covering three approach channels and one inner channel for depths of 6, 7, and 8 feet, the estimates ranging from $12,300 to $34,700 for the approach channels, and from $13,000 to $24,700 for the inner channel.

4. The investigations of the district officer lead him to the conclusion that the locality is not worthy of improvement by the provision of an inner channel, but that it is worthy to the extent of providing an outer approach channel, via the Ralston Channel, 6 feet deep at mean lower low water and 150 feet bottom width, at an estimated cost of $12,300, and an annual maintenance charge of $250. In this view the division engineer concurs.

5. In addition to the information furnished by the district officer, the board has received a number of communications[1] from interested parties bearing upon the need of better navigation facilities, the principal argument being the isolation of the community and its entire dependence upon the water for communication with the markets on the mainland. The amount of commerce is not large, but it represents the entire business of some 1,700 people, whose only connection with the outside world is through these waters. Owing to these conditions, the board is in general accord with the views of the district officer and the division engineer, but it believes that the improvement of Buxton Channel would better serve the needs of the community and would probably involve less cost of maintenance than the improvement at Ralston Channel. The board therefore reports that in its opinion it is advisable for the United States to undertake the improvement of the Buxton Channel so as to provide a depth of 6 feet at mean lower low water and a width of 150 feet, at an estimated cost of $17,900, with the understanding that the project will be discontinued in case the cost of maintenance is found to be excessive when compared with the commercial benefits. The total amount of the estimate for first construction, $17,900, should be made available in one appropriation.

6. In compliance with law, the board reports that there are no questions of terminal facilities, water power, or other subjects so related to the project proposed that they may be coordinated there-

[1] Not printed.

with to lessen the cost and compensate the Government for expenditures made in the interests of navigation.

For the board:

W. M. BLACK,
Colonel, Corps of Engineers,
Senior Member of the Board.

PRELIMINARY EXAMINATION OF CAPE CHANNEL, PAMLICO SOUND, N. C.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Wilmington, N. C., December 10, 1912.

From: The District Engineer Officer.
To: The Chief of Engineers, United States Army.
(Through the Division Engineer.)
Subject: Preliminary examination report, Cape Channel, N. C.

1. Cape Channel is a name given to the deepest water from Pamlico Sound generally southeast toward the Barrier Beach, opposite Cape Hatteras. It is a part of the sound, entirely surrounded by water, and its location is marked by a few buoys and a beacon. The location of the channel was ascertained from the inhabitants in the vicinity. Cape Channel has not been found designated as such on the charts or maps on file.

The actual location of Cape Channel does not seem to fit the terms in the clause in the river and harbor bill providing for this examination, and if Cape Channel could be found to pertain to the basin just behind the Barrier Beach, it would fit, and the terms "inner and outer approaches thereto" would have definite signification. Since the best obtainable evidence showed Cape Channel to be as first stated it was not thought that in propriety a more inclusive meaning could be applied to it.

2. On Barrier Beach extending from Cape Hatteras westward to Hatteras Inlet are three communities, Buxton, Trent, and Hatteras, having populations of 400, 200, and 400, respectively. Fully 10 per cent of this population consists of United States employees in the life-saving and light-house establishments, and their families, while the principal occupation of the remainder are connected with the fishing industry.

Besides those belonging to the communities above mentioned, some 700 people reside on this portion of the Barrier Beach. The nearest important railroad towns, through which their trading is in large part carried on, are Elizabeth City, N. C., 95 miles north, and Washington, N. C., 95 miles west. In the locality there is no timber, and there is no agriculture except home gardens.

3. There is a basin of irregular shape inclosed by the 6-foot contour lying between the Barrier Beach and deep water in Pamlico Sound, protected on the north by a submerged reef having from 1 to 3 feet of water over it. This basin is about 9 miles long, varying from 1 to 3 miles in width, and is entered at the west end by boats from Washington, drawing 4 feet, by way of Hatteras Inlet Channel. Boats of the same draft from Elizabeth City enter this basin at the east end by Cape Channel, lying to the northward of Clam Shoal and extending through the reef toward the beach. A narrow channel of about $4\frac{1}{2}$ feet depth, with bottom of soft mud and sand connects the end of

Cape Channel with the eastern end of the basin. The lunar tides in this basin have a rise and fall of about 1 foot, which may be increased or diminished by double that amount during certain periods by heavy winds. The vessels in use consist of gasoline boats about 40 feet long and of about 7 net tons, and schooners about 60 feet long and of about 30 net tons.

4. No record is known to exist of any previous examination of this locality with a view to improvement, and no record of any work of improvement having been prosecuted.

5. A reconnaissance was made as fully as practicable and a sketch map made from notes made in the field September 16, 1912, by Assistant Engineer Harry T. Paterson, and from Coast Chart 142, is herewith.[1]

6. A hearing was held at Hatteras in connection with this preliminary examination on September 16, 1912. It was attended by 25 parties locally interested.

7. It is the desire of those interested to have what is locally known as the Narrow Place, just inside of Cape Channel, dredged to 8 feet, with a continuation of dredging to the same depth where necessary, throughout the basin beyond Durants Point, to Hatteras. A width of 400 feet was suggested.

8. The claim was made that an improvement of the character desired would develop the fishing industry to a great extent by permitting vessels of 7-foot draft to visit the locality, resulting in a great saving in lighterage charges and the establishment of regular, frequent service by this class of boats, it not being practicable for the small boats now in use to make trips in stormy weather to or from Washington, N. C., Elizabeth City, N. C., or even Roanoke Island. The improvement would be of benefit to fishermen, boatmen, and merchants.

9. Freight rates from Elizabeth City are cited as follows: Pork, 30 cents per barrel; flour, 25 cents per barrel; salt, 10 cents per 200-pound sack; fertilizer, $2.15 per ton; coal, $2.15 per ton; dry goods, $5 per ton. Examples of freight rates from the locality can not be given, as the products are purchased and transported by the boat owners.

10. The annual commerce for this locality is about as follows:

Article.	Amount in customary units.	Amount in short tons.	Valuation.
Ice	533 tons	533.0	$3,731
Fertilizers	18 tons	18.0	360
Coal	58 tons	58.0	232
Dry goods	83,000 pounds	41.5	6,225
Groceries	570,000 pounds	285.0	42,750
Hardware	120,000 pounds	60.0	9,000
Salt	380 sacks	38.0	342
Oysters	3,000 bushels	120.0	750
Fish	1,153,000 pounds	576.0	57,600
Shingles	165,000	82.5	660
Lumber	250,000 feet B. M.	500.0	5,000
Gasoline	170 barrels	31.0	1,240
Clams	35 bushels	1.7	35
Kerosene	250 barrels	45.0	1,500
Grain	200,000 pounds	100.0	3,500
Hay	250,000 pounds	125.0	3,000
Hogs	40 head	2.0	400
Wood	35 cords	35.0	140
Total		2,651.7	136,465

[1] No iprinted.

The transportation of the principal receipts, i. e., groceries and dry goods, is practically uniform throughout the year, while the shipments of the principal item, i. e., fish, are increased for the latter part of the calendar year.

11. The only existing terminal facilities are those provided by, and for, the fishing industry. These consist usually of a shed built on piles from a quarter of a mile to 3 miles from shore, where fish are received, iced, and boxed for shipment. There are 8 or 10 of these fish houses located off Hatteras, Buxton, and Trent where the schooners can get to them and they appear to be adequate for their purposes. The necessity for public terminals is not urgent, but would probably follow closely upon any improvements made, and one public wharf should be provided to serve each of these three communities in order to secure to them the full benefit of such improvements. Such wharves would as located off shore and connected by trestle bridges to shore, and not very elaborate affairs. Existing terminals are private without mechanical appliances for handling freight, open to all without charge, as far as ascertained. No contract between any railroads and water carriers for interchange of traffic with this locality, exists as far as ascertained. No highways exist to the terminals; and those which are connected with the mainland are offshore and have light, primitive pile structures by which persons on foot can pass from one to the other.

12. There are no opportunities for the development of water power for industrial and commercial purposes.

13. It is highly improbable that the improvement desired would be found justifiable to the extent advocated by those interested on account of the excessive cost of such improvement; the little existing commerce; the small population affected; and the lack of any prospect of great commerce resulting from the improvement. Although a channel 8 feet deep and 400 feet wide is clearly out of the question and can not be advocated, it is possible that some lesser improvement may be made at a relatively small cost which the peculiar needs of these communities might render justifiable. A survey for the purpose of securing necessary facts will be costly, as it involves field work over a great expanse of water. As such survey is considered essential before a satisfactory conclusion as to the proposed improvement may be arrived at, a survey is recommended.

14. Record of hearing held at Hatteras on September 16 is inclosed herewith.

H. W. Stickle,
Major, Corps of Engineers.

[First indorsement.]

Office of Division Engineer, Southeast Division,
December 16, 1912.

To the Chief of Engineers:

1. I do not think that the proposed locality is worthy of a survey, and I do not recommend any allotment for a survey.

2. I would advise that those interested be notified that the decision in the matter is unfavorable to the project.

Dan C. Kingman,
Colonel, Corps of Engineers.

[Third indorsement.]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
March 31, 1913.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

For reasons stated herein the board concurs with the district officer in recommending a survey in order to determine the extent and advisability of the improvement. The board requests that the district officer consider and submit an estimate for a channel across Clam Shoal, as well as by the route shown on sketch.

For the board:

WM. T. ROSSELL,
Colonel, Corps of Engineers,
Senior Member of the Board.

PRELIMINARY EXAMINATION HEARING HELD AT SCHOOLHOUSE, HATTERAS, N. C., SEPTEMBER 16, 1912, 2 P. M.

Those present were:
Maj. H. W. Stickle, Corps of Engineers, United States Army, district engineer officer.
Mr. Harry T. Paterson, assistant engineer.
J. H. Fulcher, Frisco, N. C.
A. J. Fulcher, Frisco, N. C.
E. E. Burrus, Hatteras, N. C.
C. E. Wilson, Hatteras, N. C., assistant weather observer.
B. P. Ballance, Hatteras, N. C., postmaster.
George Pell, Hatteras, N. C.
E. H. Pell, Hatteras, N. C.
T. W. Pell, Hatteras, N. C.
T. B. Pell, Hatteras, N. C.
S. S. Oden, Hatteras, N. C.
Loran Ballance, Hatteras, N. C.
W. S. Barnett, Buxton, N. C.
S. B. Smith, Buxton, N. C.
Capt. Styron, Buxton, N. C., Cape Point Station.
Dr. E. P. Jones, Hatteras, N. C.
C. H. Gray, Buxton, N. C.
O. C. Fulcher, Buxton, N. C.
D. E. Quidley, Buxton, N. C.
W. E. Quidley, Buxton, N. C.
G. T. Bailey, Buxton, N. C., postmaster.
N. F. Jeanette, Buxton, N. C.
C. D. Jeanette, Buxton, N. C.
D. F. Jeanette, Buxton, N. C.
B. M. Jeanette, Buxton, N. C.
B. F. Jeanette, Buxton, N. C.
Charles W. Berry, clerk, United States engineer office, Wilmington, N. C., reporter.

Maj. STICKLE. Gentlemen, you will please come to order. The river and harbor act approved July 25, 1912, included an item for the preliminary examination of Cape Channel, including the inner and outer approaches thereto on the east side of Pamlico Sound, N. C. This preliminary examination has been referred to me for report, and in that connection I have been authorized by the Chief of Engineers, United States Army, to hold this hearing. The preliminary examination stage is the first stage of a river and harbor improvement. After the matter has been reported by the district engineer officer, in this case myself, to the Chief of Engineers, through the division engineer, the Secretary of War may order a survey based on the report, and on the survey and other reports the matter may be submitted to Congress, which makes the appropriations for the work. This improvement is now in the preliminary examination stage. The advantage and object of holding the hearing is to give all interested parties an opportunity to express their views in public as to the necessity

for the improvement and the extent of the improvement considered advisable, and in addition this enables me to get possession of the available facts for the completion of my report so that when submitted to the reviewing authority it may be promptly acted upon. I therefore request anyone present to say what he has to say upon this matter just as freely, fully, and explicitly as he pleases. I have received a copy of a letter written by the Hon. Mr. Small to Mr. Burgess, chairman of the subcommittee on surveys, in which he incloses a memorandum as follows [reads]: "Cape Channel is the only inside harbor of quite a large population residing at Hatteras, and the section of the banks adjacent thereto and the channel leading thereto has only a depth of about 5 feet. This shallow depth extends for only a short distance and it would enable the steamboat line to place on a larger steamer and be of great advantage to this section. This section has no railroads and never can have. Their entire dependence is on the water." This is the only communication I have received in regard to this project. I would like to have anyone present make any remarks he wishes on the subject. I want you all to feel free to say just what you wish on this matter.

Mr. FULCHER. I believe I started this thing some time ago, and I would like to make a few remarks. I have drawn up a rough sketch of the location, and I was the one who drew up the petition to have this thing here and to cut through Cape Channel, and I have been in communication with our Congressman, Mr. Small, and he has written us very favorably in the matter, and we heartily appreciate the efforts that are being made for us in this matter, and all those who are here this afternoon and who are dependent upon fishing, have to use this Cape Channel, that is, all the shipments going north from here. Now, there are about 1,700 people who, you might say, are wholly dependent upon Cape Channel for their transportation, and they all want it deepened so they can carry their fish, although the people of Hatteras do not carry all their goods through it, but they go around another channel; and in this connection I have written down a few remarks which I will read to you, and I am sure what I read is the view of those who are most interested in this improvement. (Reads:)

"Gentlemen and fellow citizens: I have a few sketches I wish to call the attention of these people to in discussing this matter. Since we drew up the petition and sent to our Congressman, Mr. Small, asking him to aid us in getting this cut through the narrow place, entrance to the Cape Channel, it is the request of the people of the whole of Cape Hatteras Banks and not the Island of Hatteras alone. This cut in the narrow place and two light beacons will give us an entrance into our ports, Hatteras, Frisco, Buxton, and Avon, a population of 1,700 people, whose transportation is wholly dependent upon their fishing industry that would be transported through the Cape Channel. Whereas if this cut was changed to the Ralston Channel it would be practically used by the people of the Island of Hatteras alone, and the people of Buxton and Avon, which approximates about 1,000 people, would not derive any benefits from it at all. Therefore I do not think any fair-minded man would try to block the efforts we have made to carry this through the Cape Channel, as it is the most appropriate place. For this reason, it is the boldest channel and is now lighted off with light beacons, and two more light beacons in this cut would be but very little expense to our Government, as the same man who is now tending the beacons at the channel could tend and operate these also. We do not want you to understand us to suggest that we are opposed to having the Ralston Channel dredged. On the other hand, we would do all we can to favor it. But let us get the narrow place fixed, as you know this is but an insignificant thing to our Government, but means a whole lot to our people down here." (Exhibit "A".)[1]

This, of course, is a very insignificant thing to the Government, but it means a whole lot to us down here, and that is about all I have to say about it. I have made a rough sketch which shows what I mean [produces pencil sketch]. (Exhibit "B.")[1]

Mr. PATERSON. Please point out on this sketch the channel—the location of the channel.

Mr. FULCHER. Well, here [indicating] is the Cape Hatteras Light, and here is the beacon, and this is the channel, right across there—about 8 feet of water up to the beacon; and right across here is where we want it dredged, this narrow place here, dredged about 400 feet wide.

Maj. STICKLE. Gentlemen, you have heard what Mr. Fulcher had to say on this matter, and I will be glad to hear from the rest of you now. (Pause.) Has anyone anything to say? (Pause.) Only one man interested in this improvement?

Mr. C. H. GRAY. I am interested in it, but I am a poor spokesman. I think that Capt. Fulcher has outlined the plan just about right, as I understand it. I think his

[1] Not printed.

plan would suit all concerned. The great objection, to my mind, is that when you start to do work of this kind it ought to be a benefit to all, and not to a few. Of course, that would give us deeper water when you dig this middle ground out, and it would be a straighter course and deeper water, and that would be a benefit in that way. I think the best course should be taken that would give us the shortest route and deeper water and that would benefit all concerned.

Maj. STICKLE. What depth of water do you think necessary?

A. I think 9 to 12 feet—something like that.

Mr. SMITH. I think 8 feet of water would be sufficient.

Maj. STICKLE. You think it should be dredged to 8 feet of water?

Mr. SMITH. Yes, sir; 8 feet of water would give us a good waterway; 8 feet is abont all you can get on Croatan Sound, and I belive that would be about right here.

Maj. STICKLE. As I understand the plan as proposed by these two gentlemen, the channel through the narrow place is to be dredged to 8 feet and then through the middle ground to 8 feet—this would then give 8 feet of water all along betweeu Beaufort and Hatteras. Is that the idea of all you gentlemen?

Mr. FULCHER. That meets with my approval, sir. I help to carry on the business of this place and I think that idea will meet with the approval of the people—all the people, 1,700 in all, at least three-quarters of them, anyway—a majority of the people here, I am sure.

Maj. STICKLE. I shall be glad to hear from the rest of you—anyone who wishes to say anything on this subject.

Capt. STYRON. I think this is all right, gentlemen, as far as it goes, but if you cut across this bulkhead I believe you could save about four hours' run in going out through the Cape Channel. If you could get the Cape Channel and make it, it would be all right, provided this middle channel could be dredged out to get across. I suppose the Ralston Channel can not be considered now, but I believe it is the best that can be done under the circumstances.

Maj. STICKLE. Would this improvement result in the use of larger boats?

A. Yes; better boats and larger boats; and it would bring other enterprises to our people here. The people in power should come down here and take a look around and see what a benefit the improvement of our waters would mean to us; why it would just double our population. But as it is, if this middle channel or ground is dug out, it would not be of benefit to all these places. The most of the goods going out come from these lower places. Do not you think so, gentlemen? Yes; I think it would be of the most benefit to the people north of here. You could then go through without going way up around and save at least four hours; it makes that difference if you could go through this bulkhead or narrow place. You could come in by the Ralston Channel Light, but you must then go through this narrow place; and I think that the Ralston Channel should be dredged out; this would be much cheaper than the Cape Channel, but would cost a little more than the bulkhead or narrow place. As it is, the Cape Channel is already lighted up, and the Government vessels that come in here all use this Cape Channel. If I ordered the revenue cutter to come down, she would come in through the Cape Channel. It is now all lighted up and buoyed and there is no trouble for the Government boats to come in there and anchor. We want to have this bulkhead for about a half a mile, and maybe more than that, dredged with a cut right through there, and then coming down to the middle ground with it dredged to 8 feet deep, it would give good accommodations to Hatteras, Buxton, and Frisco. It would not take so many more lights, as there are two lights already there, and just about two more lights would be all that is needed for the channel——

Maj. STICKLÆ. The Lighthouse Department has charge of the lighting of these waters. That is a matter for the determination of that department.

Capt. STYRON. Yes; that is right. But to my mind there is no doubt about this narrow place wanting at least two more lights. Ralston Channel, at least four in all, or it might be that three would be enough, but four would be better for Ralston Channel.

Maj. STICKLE. We are confined in our considerations to the Cape Channel. There is no necessity or use in discussing the Ralston Channel. It is outside of the present project. Mr. Small in his letter to Mr. Burgess said in regard to this (reads): "Cape Channel is the only inside harbor of quite a large population residing at Hatteras, and the section of the banks adjacent thereto, and the channel leading thereto has only a depth of about 5 feet. This shallow depth extends for only a short distance and it would enable the steamboat line to place on a larger steamer and be of great advantage to this section." The act of Congress containing the provision for this preliminary examination reads (reads): "Cape Channel, including the inner and outer approaches thereto on the east side of Pamlico Sound, North Carolina," and I must say that there

is some doubt in my mind as to just what Cape Channel is, but I can not see that Ralston Channel is a part of this matter at all, and therefore I must say that Ralston Channel is not to be considered.

By Mr. PATERSON:

Q. Captain, was there an average tide this morning?—A. Pretty low tide this morning.

Q. Lower than the average?—A. Yes; lower than the average on the inside. I think when you were down there this morning it was just about a middle tide—between high and low water.

Mr. PATERSON. We sounded going across and coming back. About 4 feet deep going over, and coming back 4 feet 8 inches.

Maj. STICKLE. I shall be glad to hear from any more of you gentlemen, if you have anything to say on this subject.

Mr. G. T. BAILEY. I wish to say that I think the route there as suggested to connect the Cape Channel with the inner channel by dredging out a cut would be the most beneficial to the greatest number of our people of any route that could be selected, for this reason: That Cape Channel is the boldest channel we have in this section. It is large enough to be used by the Government boats, and with this proposed dredging I think it would make the channel of great advantage to us. You all know very well that this shallow water out here has kept transportation away from us and has always tended to keep back our interests, and I must say that I would be very glad indeed to see this dredging done, for everything that would be done there would be of great benefit to us, and I have no amendment to make, and I don't see how I can add anything to what has been said. I believe it would be of great benefit to the people and of great advantage to the people here—Hatteras, I mean. Now we might think that Ralston Channel needs this dredging more than the other place, and that is my judgment, as it would be a great advantage to us to come in that way; but if we can't get the Ralston Channel, as we have been told, then I am in favor of the route suggested as a very appropriate one, and I must indorse what has been said in favor of it.

Mr. FULCHER (explaining from sketch). You can see here—now to get into the Cape Channel you have to come down here 2 or 3 miles and make the turn, and this takes at least two or three hours, to make a good harbor. After you once get down here you can get a good harbor. No trouble about that; plenty of ground for anchoring. If this narrow place here was cut through you see we could come right down this way and save all that trip way around. There is good water there and it is used by the lighthouse steamer and the revenue cutter, and they come in there and anchor. Ralston Channel is here, and from this point it is about 3 or 4 miles to Ralston Channel by the Sound, and right across here, if it was dredged out and a couple of beacons put in, you would save 2 or 3 miles. Here is where the Ralston Channel makes in. Here is the light beacon, and from there it is just about 1 mile down to here, where the Ralston Channel comes in. Boats come into the Cape Channel here—inside of the reef.

Maj. STICKLE. Gentlemen, I want to thank you for your attendance this afternoon and the interest you have shown in this matter; also for the use of this room. If there is nothing more to be said, I will call the meeting adjourned.

SURVEY OF CAPE CHANNEL, PAMLICO SOUND, N. C.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Wilmington, N. C., February 11, 1914.

From: The District Engineer Officer.
To: The Chief of Engineers, United States Army
(Through the Division Engineer).
Subject: Survey of Cape Channel, N. C.

1. In compliance with instructions contained in department letter dated April 3, 1913, the following report of a survey of Cape Channel, including the inner and outer approaches thereto, on the east side of Pamlico Sound, N. C., with plans and estimates for improvement, is submitted:

2. Some difficulty was experienced in determining the locality and extent of Cape Channel. The channel through the reef at the east end of the basin was so called by some of the residents, while others spoke of the entire basin as "Cape Channel." This latter interpretation was adopted as there were "inner and outer approaches thereto" and the three outer and one inner approaches were investigated in detail.

3. Assistant Engineer Harry T. Paterson, to whom immediate charge of this survey was assigned, reports as follows:

A survey party, under Junior Engineer Alfred von Siller, was in the field from August 1, 1913, to September 1, 1913. The three outer approaches to the deep-water area lying between the outer reef and the shore were covered by detail soundings taken at 100-foot intervals on lines 500 feet apart. The inner approach between Durants Point and deep water was covered by soundings taken at 100-foot intervals on lines 300 feet apart.

A hydrographic base line was laid off with a graduated wire for each section covered, in detail, and the end of each base was located by triangulation. At equal intervals along this base line stakes were jetted down, from which ranges were run at right angles, and soundings located thereon by measurement with the graduated wire. Horizontal control is based on information furnished of points established by the United States Coast and Geodetic Survey. Vertical control is based on observations during the period of survey. Mean low water, as thus determined, was then corrected to mean lower low water from data obtained from the Tide Tables of the United States Coast and Geodetic Survey. The extreme variation noted at Durants Point gauge was less than 0.4, lying between plus 0.2 and plus 0.6 on this gauge. At the Cape Channel gauge, located near Buxton, the extreme variation was 0.6, being between 0.0 and plus 0.6; the zeros of both gauges being set to the same plane.

Lunar tides are not noticeable in Pamlico Sound, variation of the water surface being caused entirely by prevailing winds. The general direction of the Sound being from northeast to southwest; the winds from the northeast cause high tides in the lower end with low tides in the upper, while southwest winds have the opposite effect. By reference to the wind chart on the accompanying maps [1] it will be seen that the prevailing winds are from these directions. Cape Hatteras being located near the central portion of the sound, the water surface is little affected by these winds, both of which were encountered during the period of our observations. Westerly winds have some tendency to raise the water surface and easterly winds to depress the same, but the outer reef mitigates their effect.

4. There are no material changes in physical and commercial conditions in connection with the proposed improvement to report since the preliminary examination report was submitted.

5. On the accompanying map, in three sheets,[1] are shown in detail the various approaches by way of Buxton Channel, Clam Shoal, Ralston Channel, and Durants Point, together with an index map locating generally the proposed improvement and map showing the entire locality. Below are given estimates for cuts of 6, 7, and 8 foot depths at each of these places. Unless otherwise noted, estimates are for channels of 150-foot bottom width, having side slopes of 2:1. One foot of overdepth dredging at full price is included. The material to be removed is packed fine sand generally covered with seaweed. At Buxton Channel there is also a considerable quantity of soft mud. The amount required for maintenance is in each case difficult of determination. The maintenance could not be accomplished each year for the amounts estimated, but it probably could be accomplished every four years for four times the estimated annual amounts.

6. For the Buxton Channel cut, the 6-foot channel would be 4,460 feet long; the 7-foot channel would be 4,900 feet long; and the 8-foot

[1] Only one map printed.

channel would be 5,320 feet long. The minimum depth of water through which it passes is 2.9 feet, and the average depth is about 4.8 feet. The following is the estimate for this cut:

	Depth of channel.		
	6 feet.	7 feet.	8 feet.
Cubic yards to be removed	65,100	94,600	123,000
Unit price, cents	25	22.5	20
Cost	$16,275	$21,285	$24,600
Engineering and contingencies	1,625	2,115	2,400
Total	17,900	23,400	27,000
Estimated annual maintenance	450	500	550

7. For the Clam Shoal cut the 6-foot channel would be 3,710 feet long; the 7-foot channel would be 4,050 feet long, and the 8-foot channel would be 4,350 feet long. The minimum depth of water through which it passes is 0.8, and the average depth is about 2.3. The following is the estimate for this cut:

	Depth of channel.		
	6 feet.	7 feet.	8 feet.
Cubic yards to be removed	125,400	143,800	180,200
Unit price, cents	20	20	17.5
Cost	$25,080	$28,760	$31,535
Engineering and contingencies	2,520	2,840	3,165
Total	27,600	31,600	34,700
Estimated annual maintenance	750	800	850

8. For the Ralston Channel cut the 6-foot channel would be 2,500 feet long, the 7-foot channel would be 4,775 feet long, and the 8-foot channel would be 6,190 feet long. The minimum depth of water through which it passes is 3.3 feet, and the average depth is about 5 feet. The following is the estimate for this cut:

	Depth of channel.		
	6 feet.	7 feet.	8 feet.
Cubic yards to be removed	37,300	74,700	119,000
Unit price, cents	30	25	20
Cost	$11,190	$18,675	$23,800
Engineering and contingencies	1,110	1,875	2,400
Total	12,300	20,550	26,200
Estimated annual maintenance	250	475	600

9. For the inner approach connecting Cape Channel with the smaller basin north of Durants Point the 6-foot channel would be 3,760 feet long, the 7-foot channel would be 5,100 feet long, and the 8-foot channel would be 5,930 feet long. The minimum depth of

water through which it passes is 2.7 feet, and the average depth is 5 feet. The following is the estimate for this cut:

	Depth of channel.		
	6 feet.	7 feet.	8 feet.
Cubic yards to be removed	47,200	73,500	100,000
Unit price.....cents..	25	25	22.5
Cost	$11,800	$18,375	$22,500
Engineering and contingencies	1,200	1,825	2,200
Total	13,000	20,200	24,700
Estimated annual maintenance	375	500	600

10. For convenience in comparing, the salient features of the three entrance channels are tabulated below:

	Buxton.	Clam-shoal.	Ralston.
6-foot channel:			
Cubic yards from section	40,350	104,700	23,400
Cubic yards from 1 foot outside	24,750	20,700	13,900
Total cubic yards	65,100	125,400	37,300
Unit price per cubic yard.....cents..	25	20	30
Length channel in feet	4,460	3,710	2,500
Cost of excavation	$16,275	$25,080	$11,190
Engineering and contingencies	1,625	2,520	1,110
Total cost	17,900	27,600	12,300
Annual maintenance	450	750	250
7-foot channel:			
Cubic yards from section	67,350	126,800	48,400
Cubic yards from 1 foot outside	27,250	17,000	26,300
Total cubic yards	94,600	143,800	74,700
Unit price per cubic yard.....cents..	22.5	20	25
Length channel in feet	4,900	4,050	4,775
Cost of excavation	$21,285	$28,760	$18,675
Engineering and contingencies	2,115	2,840	1,875
Total cost	23,400	31,600	20,550
Annual maintenance	500	800	475
8-foot channel:			
Cubic yards from section	93,500	155,600	84,500
Cubic yards from 1 foot outside	29,500	24,600	34,500
Total cubic yards	123,000	180,200	119,000
Unit price per cubic yard.....cents..	20	17.5	20
Length channel in feet	5,320	4,350	6,190
Cost of excavation	$24,600	$31,535	$23,800
Engineering and contingencies	2,400	3,165	2,400
Total cost	27,000	34,700	26,200
Annual maintenance	550	850	600

11. From the above it will be seen that for all depths the Ralston Channel involves the least outlay for original construction. It is also estimated that it would require less expense for maintenance at the 6 and 7 foot depths, though slightly greater for the 8-foot depth.

12. There are two distinct lines of traffic to be served by this improvement. One is from Hatteras to Washington, N. C., and the

other from Buxton to Manteo and Elizabeth City. The Ralston Channel is most favorably located for the first line, while the Buxton Channel would best serve the other. Lying some 8 miles apart, as they do, if only one channel were improved it would necessitate a 16-mile detour for one of these lines of traffic. It is believed that of the two the traffic from Washington to Hatteras is the greater, though accurate data for this are not available. The Buxton Channel is marked by buoys and two light beacons and would require two additional beacons, while the Ralston Channel, not marked at present, would require three light beacons.

13. It is to be observed that at the hearing held in connection with the preliminary examination for the proposed improvement the Ralston Channel was offered by some parties as the most desirable for improvement, but with the understanding then had of the limitation of the scope of the examination due to the adopted meaning of the term Cape Channel, no consideration was given to Ralston Channel at that time. As stated in paragraph 2, for this survey the entire basin is considered as "Cape Channel," thus bringing Clam Shoal and Ralston Channel into consideration as "outer approaches." Probably there will be a demand for the improvement of Buxton Channel, but I believe the improvement of Ralston Channel will be as generally satisfactory to those interested as Buxton Channel, which would cost $5,600 more for improvement and $200 per year more to maintain; and it appears to me that the cost of improvement of both, or of Clam Shoal Channel is not justified by prospective benefits. An outer approach channel lying farther west than Ralston Channel is not suitable for consideration, as such a channel would ordinarily be too rough for safe use by the class of vessels operating in this vicinity on account of its close proximity to Hatteras Inlet.

14. In my opinion the commercial and other interests involved justify the improvement to a depth of 6 feet of the least expensive outer approach to Cape Channel (the Ralston Channel), and the improvement of any inner approach is not justified at the present time. Buxton will have a good depth of water available within a reasonable distance; Trent is a very small place and though deep water is distant, the construction of a nearer channel would be expensive and out of all proportion to benefits which could accrue; the inner channel at Durant's Point would cost more than the outer channel proposed. Fishing boats can take reasonably full advantage of the proposed improvement by constructing their houses and wharves farther out. Under present circumstances the improvement of an inner approach would be local in character and not worthy of being undertaken by the General Government. With the outer approach the situation is different, as the entire population of the Barrier Beach would receive benefit as well as those engaged in the fishing industry in this locality from other points. Local cooperation is not justified for the outer approach improvement.

15. I therefore recommend an appropriation of $12,300 to improve the outer approach via Ralston Channel to a depth of 6 feet and a bottom width of 150 feet, with an estimated annual maintenance cost of $250.

16. The work outlined should be completed within three months, and an initial appropriation of the entire amount to complete the project is recommended.

H. W. STICKLE,
Major, Corps of Engineers.

[First indorsement.]

OFFICE DIVISION ENGINEER, SOUTHEASTERN DIVISION,
March 9, 1914.

To the CHIEF OF ENGINEERS:

1. In the within report of the survey of Cape Channel, including the inner and outer approaches thereto, the district officer states that, in his opinion, any work on the inner portion of the channel is not justified at the present time, and for the reasons given by him I concur in this opinion.

2. With regard to the outer channels of approach, the district officer submits estimates for the improvement of three different channels leading into the main Cape Channel. The cheapest of these he recommends to be worthy of improvement. This is the one by way of Ralston Channel, and the estimate calls for a channel 6 feet in depth and 150 feet in width, at a cost of $12,300, with an estimated cost of maintenance of $250 annually.

3. The amount of commerce involved is small, being reported as 2,652 tons, with a value of $134,634. Under ordinary conditions it is believed that this cost would be excessive, but in view of the fact that this work is to benefit an isolated community, whose only method of communication with the mainland and the markets is by their boats, it is thought that exceptions could be made, and for this reason I concur in the recommendation of the district officer that the improvement of the outer approach channel via Ralston Channel is worthy of being undertaken by the General Government, at the estimated cost of $12,300, with $250 annually for maintenance.

W. C. LANGFITT,
Colonel, Corps of Engineers.

[For report of the Board of Engineers for Rivers and Harbors on survey, see page 2.]

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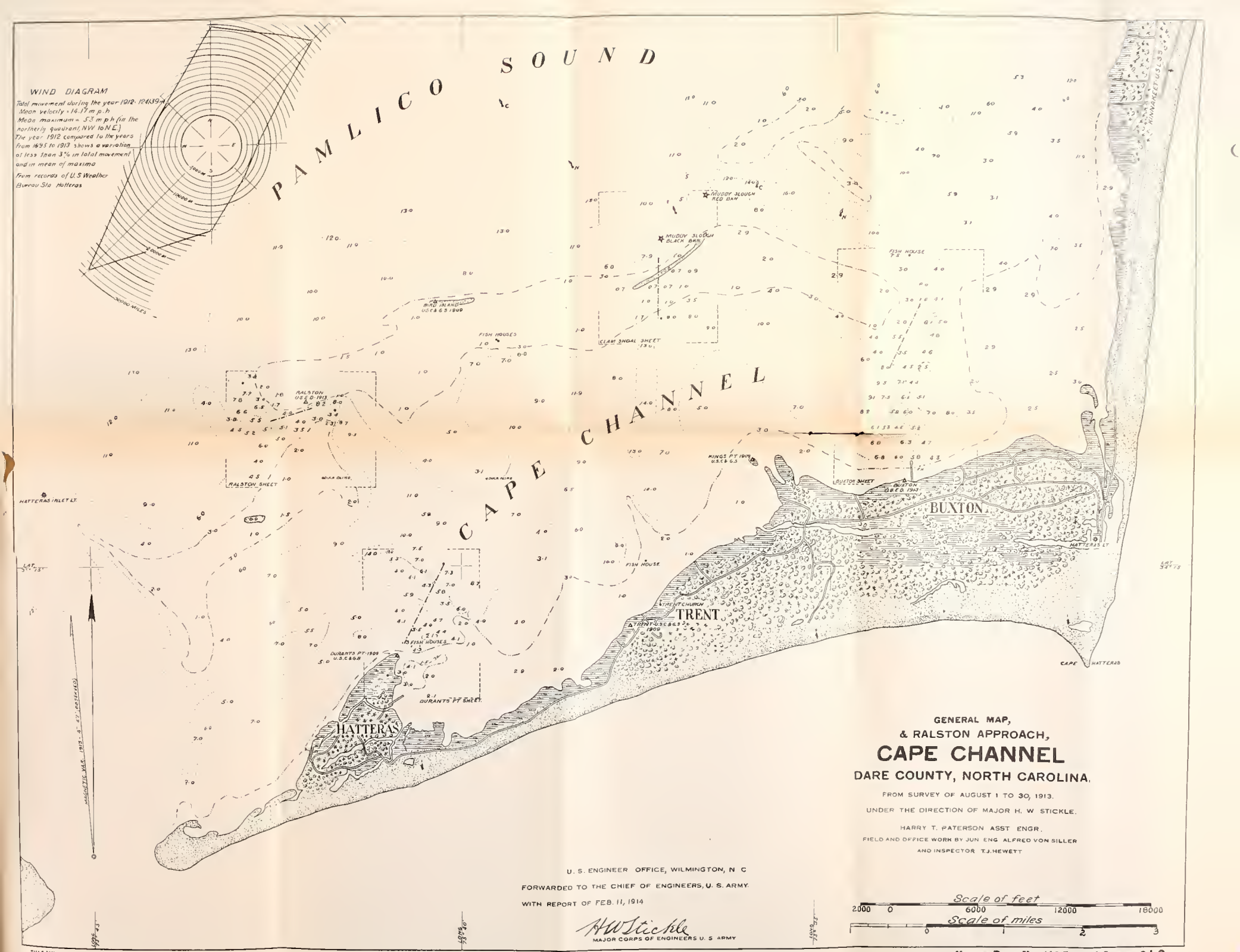
PAMLICO SOUND
CAPE CHANNEL
WIND DIAGRAM
Total movement during the year 1912- 124139 m
Mean velocity = 14.17 m p.h
Mean maximum = 53 m p.h (in the northerly quadrant, NW to NE)
The year 1912 compared to the years from 1895 to 1913 shows a variation of less than 3% in total movement and in mean of maxima
From records of U.S Weather Bureau Sta Hatteras
MUDDY SLOUGH RED BAR
MUDDY SLOUGH BLACK BAR
BIRD ISLAND USC&GS 1909
FISH HOUSES
CLAM SHOAL SHEET
RALSTON USE&O 1913
RALSTON SHEET
HATTERAS INLET LT.
KINGS PT 1909 U.S.C.&G.S.
BUXTON SHEET
BUXTON USE&O 1913
BUXTON
HATTERAS LT
TRENT CHURCH
TRENT
TRENT USC&GS 1909
DURANTS PT 1909 U.S.C.&G.S.
DURANTS PT SHEET
HATTERAS
CAPE HATTERAS
KINNAKEET U.S.L.S.S.
MAGNETIC VAR. 1913 - 5° 43' (DECREASE)

GENERAL MAP,
& RALSTON APPROACH,

CAPE CHANNEL

DARE COUNTY, NORTH CAROLINA.

FROM SURVEY OF AUGUST 1 TO 30, 1913.

UNDER THE DIRECTION OF MAJOR H. W. STICKLE.

HARRY T. PATERSON ASST ENGR.

FIELD AND OFFICE WORK BY JUN ENG ALFRED VON SILLER AND INSPECTOR T.J.HEWETT

U. S. ENGINEER OFFICE, WILMINGTON, N C

FORWARDED TO THE CHIEF OF ENGINEERS, U. S. ARMY.

WITH REPORT OF FEB. 11, 1914

H W Stickle

MAJOR CORPS OF ENGINEERS U. S ARMY

Scale of feet

2000 0 6000 12000 18000

Scale of miles

0 1 2 3

House Doc. No. 1023; 63d Cong., 2d Sess.